

length of said parallel conductors between end points where the two conductors are electrically coupled together;

a balancing core operatively associated with said pair of parallel load conductors;

and

a current sensor operatively associated with each said pair of parallel load conductors[.];

wherein said current sensor [and said conductors being respectively configured and arranged such that the current sensor] produces a signal representative of the difference in the current flow in the two conductors.

17. (Twice amended) A method for detecting series and parallel arcing faults in a defined zone of an electrical circuit supplying electrical power to a load [such as an aircraft circuit], comprising:

splitting a load conductor into a single pair of substantially identical parallel insulated conductors and electrically coupling and terminating the end points of said conductors together, so that each conductor of said pair of conductors carries substantially half the total phase current during normal operating conditions, thereby defining a detection zone comprising the length of said parallel conductors between end points where the two conductors are electrically coupled together;

providing a differential current sensor operatively associated with each said pair of parallel conductors a signal representative of the difference in the current flow of the two conductors; and

providing a detectable current unbalance in the presence of said parallel fault by inducing mutually canceling insertion impedances in said pair of parallel load conductors.

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[configuring and arranging a current sensor and said conductors such that the current sensor produces a signal representative of the difference in the current flow of the two conductors.]

Please add the following new claims:

33. (New) The system of claim 1 wherein each of the individual conductors of said pair of load conductors is essentially half the size required of a single load conductor for the total phase current under normal operating conditions of said load.

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34. (New) The method of claim 17 wherein each of the individual conductors of said pair of load conductors is essentially half the size required of a single load conductor for the total phase current under normal operating conditions of said load.

35. (New) A zone arc fault detection system for detecting arcing faults in a defined zone of an electrical circuit supplying electrical power to a load, comprising:

a single pair of substantially identical parallel insulated load conductors each of which is essentially half the size required of a single load conductor for the total phase current under normal operating conditions of said load;

a balancing core operatively associated with each said pair of parallel load conductors; and

a current sensor operatively associated with each said pair of parallel load conductors, said current sensor and said conductors being respectively configured and arranged such that the current sensor produces a signal representative of the difference in the current flow in the two conductors.

36. (New) A system of claim 35 wherein said electrical circuit supplying electrical power to a load is installed in an aircraft.

37. (New) A system of claim 36 and further wherein a conductive frame of said aircraft provides a neutral current return connection.

38. (New) A method for detecting series and parallel arcing faults in a defined zone of an electrical circuit supplying a load, comprising:

splitting a load conductor in each said defined zone into a single pair of substantially identical parallel insulated conductors each of which is essentially half the size required of a single load conductor for the total phase current under normal operating conditions of said load;

providing balanced insertion impedances in said pair of conductors to enhance current unbalance detection during said parallel arcing fault;

providing a current sensor operatively associated with each said pair of parallel conductors; and

configuring and arranging a current sensor and said conductors such that the current sensor produces a signal representative of the difference in the current flow of the two conductors.

39. (New) A system of claim 38 wherein said electrical circuit supplying electrical power to a load is installed in an aircraft.

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40. (New) A system of claim 39 and further wherein a conductive frame of said aircraft provides a neutral current return connection.